

1. A solid sample was received and we fractured it by applying physical force. A representative piece of the fractured material was selected and analyzed by scanning electron microscopy (SEM) and powder x-ray diffraction (XRD). The SEM images revealed a fibrous structure, with individual fiber components having lengths on the micrometer scale, and widths/heights on the nanoscale. Therefore, we concluded that the materials are nanostructured. Representative images can be seen in Figure 1.

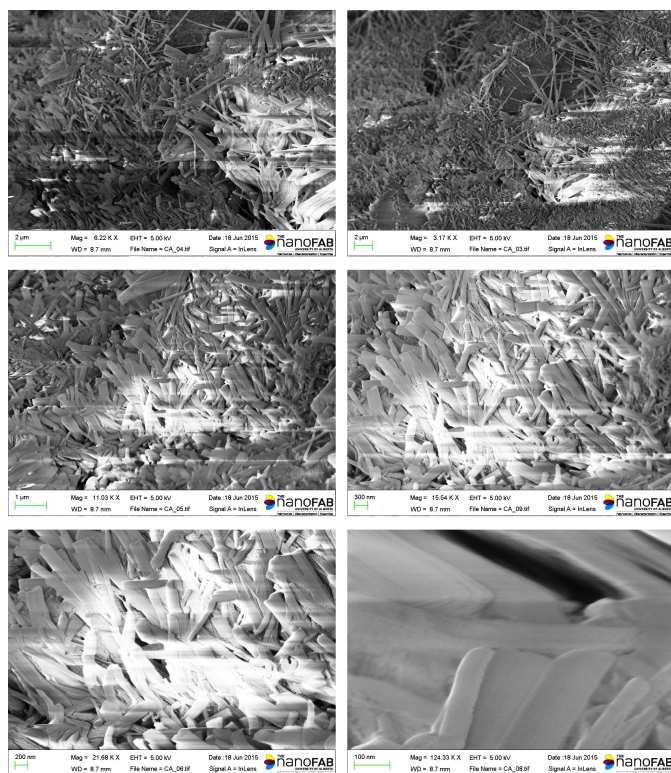


Figure 1. SEM images of a representative piece of the fractured solid material at various magnifications, scale bars are on bottom left of each image.

2. Next, we determined via XRD if the materials were made of amorphous fibers or crystalline fibers. Since there were multiple sharp peaks in the XRD spectrum in Figure 2, we can conclude that the materials are crystalline; if the materials were amorphous they would exhibit very broad peaks. Therefore, we could refer to the materials as nanocrystalline. Finally, based on the known composition of the materials, we determined that the material is composed of MgCl_2 crystals, although the major peaks are not matching with MgCl_2 . There is no evidence of MgO . More work will need to be done to determine the exact crystal structure if that is desired at a later stage.

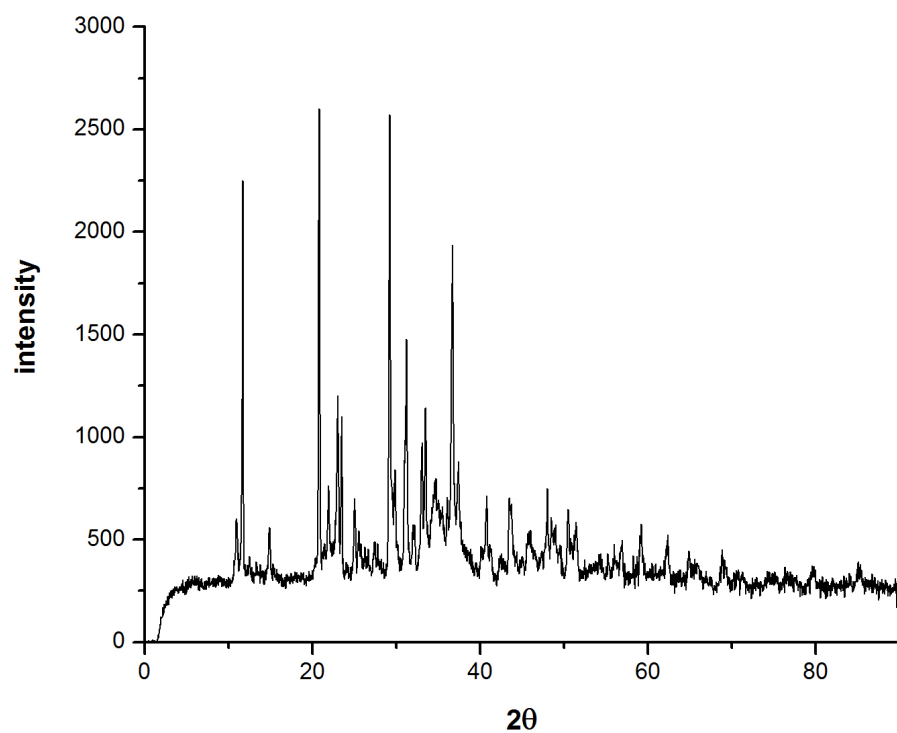


Figure 2. XRD spectrum obtained from a representative piece of the fractured material.